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Suppliers' Information Note

For The BT Network

BT Dense Wave Division Multiplex 10G Wavelength Services

Service & Interface Description

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1. Introduction

This Suppliers' Information Note (SIN) provides a description of the BT's Dense Wave Division Multiplex (DWDM) 10G Wavelength services and their interfaces.

2. Service Outline

2.1 General

BT's DWDM Wavelength services are end-to-end managed wavelength services, utilising Dense Wave Division Multiplexing and offering very high bandwidth connectivity of 10 Gbit/s per wavelength. The services available are detailed below :-

Single Client Interface

- 10 Gigabit Ethernet (LAN Phy)
- 10 Gigabit Ethernet (WAN Phy)
- SDH STM-64
- 10G Fibre Channel

Multiple Client Interfaces

- 1 Gigabit Ethernet
- 1 Gigabit Fibre Channel
- 2 Gigabit Fibre Channel
- 4 Gigabit Fibre Channel
- 1 Gigabit FICON
- 2 Gigabit FICON

DWDM Wavelength services are intended for connection to a vendor's device thatuses standard optical connectors of LC/PC or SC/PCof either Multi-Mode, 850 nm or Single Mode, 1310 nm.

2.2 Service Options

BT's 10G DWDM Wavelength services are offered in different configurations that are marketed under different service names. Options include:

- Service available within a distance-limited Metropolitan area or over greater distances, dependant on the specific service
- protected wavelengths using, as far as possible, dual access diverse fibre routes (a "worker" and a "protection" route) between the customer sites and nodes of BT's DWDM network
- unprotected wavelengths using, single access fibre routes between the customer sites and nodes of BT's DWDM network
- the number of customer sites able to be linked

2.3 Network Topology

BT's 10G service is offered in three distinct topologies –

a) Point to Point,
b) Linear
c) Ring.

A brief description is given below:-

a) Point to Point –
A dedicated Fibre connection between two customer sites with a terminating NTE device at each end. Depending on the fibre distance, amplification maybe required at a suitable BT mid point site. This topology can be provided with a secondary diverse fibre route to provide protection to the primary fibre path. The secondary fibre route will terminate on the same NTE device as the Primary fibre route, allowing fail-over to occur within 50 ms.

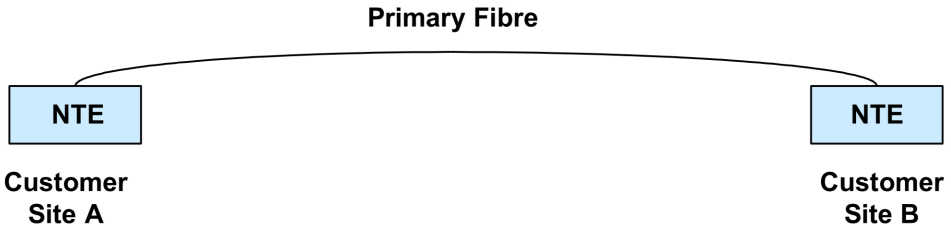

Figure 1. Unprotected Point to Point Topology

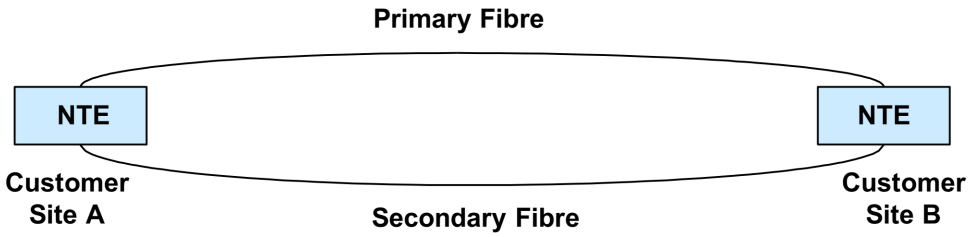

Figure 2. Protected Point to Point Topology

b) Linear –
This is similar to a point to point topology but allows a customer to add and drop services at sites along the fibre route. Fibre protection cannot be offered with this topology.

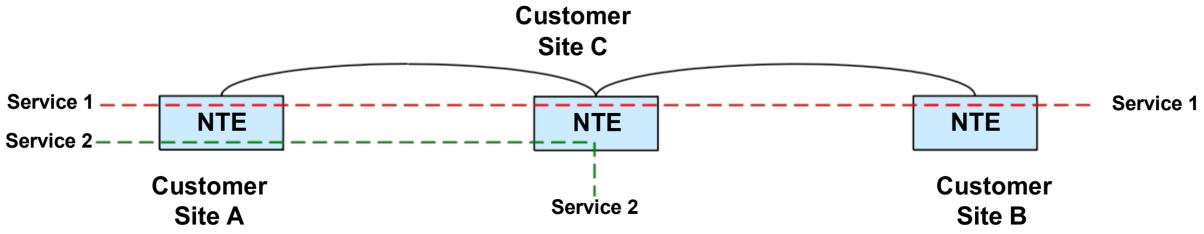

Figure 3. Linear Topology

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c) Ring –
Three or more customer sites can be connected via dedicated fibres between each site. Service protection can be offered by using optical switching on the NTE device allowing fail-over between the primary path and secondary to occur within 50 ms.

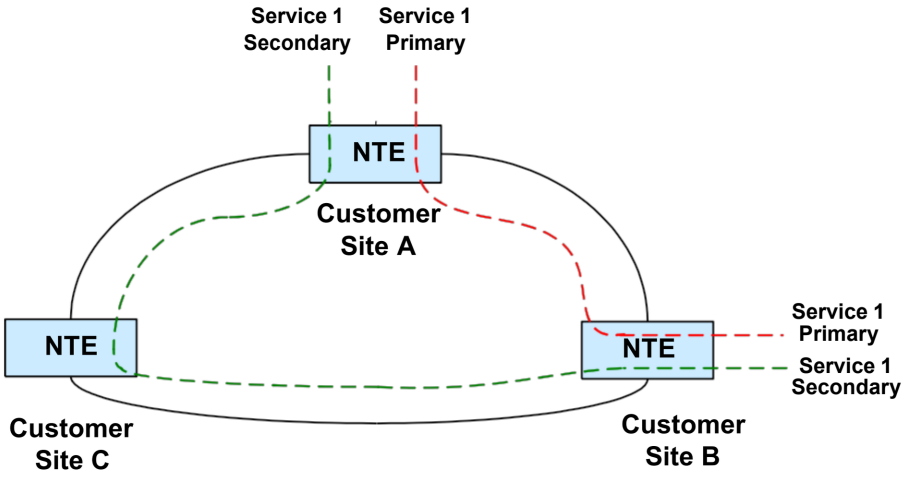

Figure 4. Ring Topology

2.4 Geographical Availability

BT's DWDM Wavelength services are offered in all major cities of the United Kingdom, but provision is "Subject to Survey".

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3. Customer Interface

The customer interfaces offered are shown in Table 1. These interfaces are described in the documents listed in section 6, References.

Service supported	Bandwidth bit/s	1310 nm	850 nm
		SM	MM
10 Gigabit Ethernet (LAN Phy)	**10.3125G**	**Yes**	**No**
10 Gigabit Ethernet (WAN Phy)	**9.95328G**	**Yes**	**No**
10G Fibre Channel	**10.5187G**	**Yes**	**No**
SDH STM-64	**9.95328G**	**Yes**	**No**
Gigabit Ethernet	**1.25G**	**Yes**	**Yes**
Fibre Channel	**1.06G**	**Yes**	**Yes**
2G Fibre Channel	**2.125G**	**Yes**	**Yes**
FICON	**1.06G**	**Yes**	**Yes**
2G FICON	**2.125G**	**Yes**	**No**

Note: 850 nm MM is not available on all DWDM services.

Table 1. Interfaces supported

3.1 Client Protocol Restrictions

The DWDM equipment used supports Distance Extension for Fibre Channel and FICON protocols with full line rate being available to a theoretical maximum distance of 1600km at 1G. However, in order to achieve these distances the attached SAN equipment must be able to support the Buffer Crediting technology.

3.2 Connector

The interface is at the Network Termination Point (NTP), i.e. the point of connection between the BT Network Terminating Equipment (NTE) and the CPE interface. Optical interfaces are presented as SC/PC or LC/PC (on request) connectors.

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3.3 Client Side Optics

Table 2 provides details the Optical power margins for both the receive and transmit interfaces of the client facing optical interfaces

Protocol	Receiver Minimum	Receiver Overload	Transmit Minimum	Transmit Maximum
10GE, 10G FC, SDH STM-64	-11 dBm	-1 dBm	-6 dBm	-1 dBm
Single Mode – GE, 1G & 2G FC, 1G & 2G FICON	-20 dBm	-3 dBm	-9.5 dBm	-3 dBm
Multi Mode - GE, 1G & 2G FC, 1G & 2G FICON	-15 dBm	0 dBm	-10 dBm	-3.5 dBm

Table 2. Optical power margins

3.4 Fibre

The fibre optic cables that BT uses in the deployment of its DWDM service meets with the fibre optic cable specifications as detailed below.

Local Single Mode Fibre in accordance with G.652[2].
Remote Single Mode Fibre in accordance with G.652.
OM1 Multi-Mode Fibre 62.5 µm @ 850nm in accordance with G.651[1].

4. NTE Power Requirements

The BT NTE requires a 230V AC mains supply. The power consumption of the NTE will depend on the customers' requirements.

If the customer wishes the NTE to be powered from a 48V DC supply, it is the customer's responsibility to provide and maintain this supply.

5. Further Information

Further information on BT's DWDM Wavelength services, including connection availability between particular sites, is available from the Advanced Data Services Helpdesk .If you have enquiries relating to this document then please contact: sinet.helpdesk@bt.com

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6. References

1	ITU-T G.651	Recommendation G.651 (02/98) - Characteristics of a 50/125 μm multimode graded index optical fibre cable
2	ITU-T G.652	Recommendation G.652 (04/97) - Characteristics of a single-mode optical fibre cable
3	SIN 373	BT WaveStream Connect-Service Description
4	ESCON	SIN 373 - BT WaveStream Connect, Service Description
5	Fast Ethernet	SIN 118 LAN Extension Service Nos.1, 2 & 10- Service Description
6	Fibre Channel	SIN 373 - BT WaveStream Connect, Service Description
7	FICON	FICON, the IBM zSeries zOS channel protocol succeeding ESCON
8	Gigabit Ethernet	SIN 360 Gigabit Ethernet for the BT Network - Interface Characteristics
9	ITU-T G.957	Optical interfaces for equipments and systems relating to the synchronous digital hierarchy
10	10 Gigabit Ethernet	IEEE 802.3 Ethernet based LANs clause 49

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7. Abbreviations

CPE	Customer Premises Equipment
DWDM	Dense Wavelength Division Multiplexing
ESCON	Enterprise Systems Connectivity architecture
FC/PC	Fibre Connector / Planar Convex
FICON	FIbre Connectivity
Gbit/s	Gigabits per second
IBM	International Business Machines
ITU-T	International Telecommunication Union- Telecommunications Standardization Sector
LAN	Local Area Network
Mbit/s	Megabits per second
MM	MultiMode
NM	Nano Metre
NTE	Network Terminating Equipment
NTP	Network Terminating Point
SC/PC	Subscription Channel / Physical Contact
SIN	Supplier Information Note
SM	Single Mode
WAN	Wide Area Network
WDM	Wavelength Division Multiplexing

8. History

Issue	Date	Changes
Issue 1.0	December 2005	First published.
Issue 2.0	May 2011	Major Update
Issue 2.1	April 2015	Change SINet site references from http://www.sinet.bt.com to http://www.btplc.com/sinet/
Issue 2.2	July 2020	Change SINet site references from http://www.btplc.com/sinet/ to https://www.bt.com/about/sinet

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